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[Issued December 19, 1922]

THE DEVELOPMENT OF YOUNG COSTA HUMMINGBIRDS

By ROBERT S. WOODS

WITH FOUR PHOTOS BY THE AUTHOR

WHILE following the progress of a pair of young Costa Hummingbirds (*Calypte costae*) at Azusa, California, in May, 1921, I was impressed with their slow growth as compared with that of the smaller passerine birds; so, on finding another nest, on May 18, 1922, I kept as accurate a record as possible of their development.

This latter nest (figure 46) was located about four feet from the ground on a lower limb of an avocado tree some ten feet in height. It contained the usual two eggs when discovered and for two weeks thereafter. On the morning of June 1 there appeared one black, grub-like young hummer, with stubby, triangular bill and a double row of yellowish down along the back, the body being otherwise bare. The afternoon of the following day the second egg was hatched. The egg shells were not removed from the nest. The bill of the newly hatched hummingbird is a little longer than the width at the base, light in color, and abruptly differentiated from the head, which is comparatively broad and straight across the front. The abdomen is reddish brown, and the sides as well as the upper parts are black.

On the morning of June 7 pin-feathers had appeared on the older bird and by the afternoon of June 8 on the younger also. The bills were longer by this time and more tapering from the head and were mainly dark colored. On the 10th the older one had assumed the peculiar position shown in figure 47, with bill pointing straight up. This attitude is apparently made necessary by the fact that the young hummer is too long for the nest, but not yet large enough to hold its head above the edge. On the 13th the feathers were becoming soft and fluffy-looking and the older bird could open its eyes, at least partly. By the 15th both birds were able to sit up and stretch their wings and view the surroundings.

When inspected on June 17 the older hummer appeared fully feathered except for the shortness of tail and wing feathers. The bill was about the length of the head and was still straight and conical in outline. On the evening of the 21st the older bird seemed alert and ready to leave the nest. Upon moving the limb on which the nest was placed both birds suddenly flew to neighboring trees thirty feet away. The younger, though it could fly from one tree to another,

had difficulty in securing a foothold and generally dropped to the ground. It made no attempt to escape when picked up and when finally replaced in the nest, as an experiment, it settled itself contentedly and remained there for about 24 hours, leaving when I approached the nest the next evening. At that time its flight was stronger and it seemed well able to care for itself.

For purposes of comparison I noted the approximate time spent in the nest by the young of several common birds nesting at about this same time. These were the House Finch (five nests), Green-backed Goldfinch, Western Lark Sparrow, Anthony Brown Towhee (two nests) and Western Mockingbird. The length of time ranged from 10 to 16 days, the longest in the case of the Mockingbird and perhaps one of the Linnets, the shortest for the Lark Sparrow and Towhee, which probably left their nests rather prematurely. These figures are

Fig. 46. Nest (no. 2) of Costa Hummingbird. Azusa, California, May 19, 1922.

not intended to be accurate, but they are in all cases considerably less than the 20 days which the Hummingbirds required. The corresponding period for the brood observed the previous year was not determined exactly, but I believe it to have been 22 or 23 days.

On June 2, 1922, I found another Costa Hummingbird building a nest near the end of a long horizontal limb of a good-sized avocado tree, at a height of about five feet from the ground. Her method was first to alight in the nest, then place the material under her (figure 48) and compact it by treading with the feet and turning about. Material for the outside of the nest was placed while hovering or while perched on a branch. On one occasion after leaving the nest the bird flew up to a twig a few feet above, whereupon I was surprised to see another hummer alight in the nest and rearrange some of the material, after-

wards sitting there for some time until the presumably rightful owner presently darted at the intruder and drove her away. The nest was composed largely of small achenes bearing soft pappus. Other items noted were fibers, minute leaves, feathers and a short piece of string, the whole bound securely to the branch with cobwebs.

One egg was found in this nest on the afternoon of June 6 and another the next morning, this before the walls of the nest were entirely filled in. The nest was by no means considered complete with the laying of the eggs, but additional material was constantly brought, so that at times the eggs were almost concealed by it. After 14 or 15 days' incubation the bird disappeared from the nest and was seen no more, at least in that vicinity.

The behavior of the hummingbird on the nest is directly opposite to that of many other birds. It does not remain motionless in the hope of escaping notice,

Fig. 47. Young Costa Hummingbirds in nest (no. 1). Azusa, May 18, 1921.

but often flies when approached within 30 or 40 feet. If one stands quietly even at a much less distance it will soon return, to leave again at any sudden motion. Thus the idea of concealment of the location of its nest does not enter into its thoughts or instincts. Those nests which I have found have been so situated that a clear outlook could be obtained in at least two directions. The hummingbird while incubating seems to require but little time for procuring food, as I have seldom found them absent from their eggs, and of course the female is not relieved by her mate, as is the case with so many birds, nor is she fed by him as are the female finches. The owner of the nest shown in figure 49 was more shy than usual and it was necessary in securing the photograph to remain at some distance, operating the shutter with a thread while reflecting light on the sub-

Fig. 48. Female Costa Hummingbird arranging nest material. Nest no. 3; Azusa, June 8, 1922.

Fig. 49. Costa Hummingbird feeding young. Nest no. 2; Azusa, June 16, 1922.

ject by means of a mirror. She had no fear of the camera, however, and once returned to the nest while my head was under the focusing cloth.

In no case have I seen a male hummingbird in the vicinity of the nest or in any way showing interest in the matter. In fact, all the males had apparently started on their southward migration by the middle of June, 1922, or soon after the eggs had been laid in the last nest and while the young in the second nest were no more than half grown. None was seen earlier than May, probably on account of the lateness of the season, so their stay was very short this year. By July 1 the females and young were also noticeably scarcer. If the owner of the third nest had remained to hatch out and rear her young she would probably have been detained beyond the usual time for migrating.

Despite the small size of the hummingbirds, and of the Costa in particular, the eggs and young as well as the adults must be peculiarly immune to depredations of natural enemies, as evidenced by their survival in the face of several unfavorable conditions brought out in the foregoing notes and which may be enumerated as follows: First, only two eggs are laid and presumably only one brood raised each year by the Costa Hummingbird; second, the period during which the young are confined to the nest is from 50 percent to 100 percent greater than in the case of the smaller passerine species; third, the young are entirely dependent upon the female parent for sustenance. That the hummingbirds are able to maintain their numbers under these handicaps can but increase our admiration for these tiny but highly specialized and intelligent creatures.

Los Angeles, California, August 21, 1922.

EVIDENCE OF MUSICAL "TASTE" IN THE BROWN TOWHEE

By RICHARD HUNT

TO BEGIN WITH I wish to establish in the minds of those readers who do not happen to be familiar with the Brown Towhee (*Pipilo crissalis crissalis*) a working idea of this bird's song. The song is normally a staccato series of sharp metallic clinks with intervals constantly decreasing so as to carry the utterance into a thrill or vibration toward the end. The "shape" can be easily imagined by thinking of some resilient object, say a golf ball, dropped on a hard surface and allowed to bounce itself motionless, thus: *tip———tip——tip—ip-prrrrr.* A very good idea of the timbre can be gained by striking together two silver dollars so as to produce a smart and rather "live" ring.

Except in two instances, which I am about to describe, I never was struck by any signs of instability in the Brown Towhee's song. On the contrary I had come to consider the song so stereotyped that it would be absurd to expect any marked individual divergences. "Brownie" had become in my mind a dull fellow, musically, particularly devoid of originality. It was refreshing, therefore, to hear first one and then another individual of the species sing a song that was decidedly "off color"—not, mind you, in any trivial matter of mechanics due to inexperience or adventitious defect of execution, but in what I may call subject matter. Both of these "aberrant" singers that by good fortune came to my notice departed from the type utterance of their race by *adding* some *brand*

new notes at the end of the common song; and these brand new notes were unmistakably *imitated* from other species.

I heard the first of these two abnormal songs near Chalk Peak, in the Santa Lucia Mountains, Monterey County, California, June 22, 1919. Over and over again the bird sang the typical "bouncing" song of the species, *plus* a low bubbling warble of four syllables. The warble was so nearly identical with part of the song of the Western House Wren (*Troglodytes aedon parkmani*) as to be, in itself, mistakable for it. The song ran: *tip———tip——tip—ip-prrrrr, chreh-chreh-chreh-chreh.* This song struck me at the time as a "freak", but I made a careful record of it, nevertheless, and on my return home filed the record away.

This "freak" song was given new meaning when, three years later, namely, on May 2, 1922, I heard, in the Botanical Gardens of the University of California, the following: *tip———tip——tip—ip-prrrrr, chrip-chrip.* The added feature this time was a perfectly good chirp of the Linnet (*Carpodacus mexicanus frontalis*). The towhee sang this song repeatedly with no deviation except that occasionally it used a single instead of a double chirp.

The thing that seems to me significant about this business is that these two "off" songs, coming by chance to my attention, and occurring quite independently of each other in point of space and time, should be so remarkably alike in their "offness". I can hardly escape the belief that the observed facts indicate a racial, rather than an individual tendency at work. Chauncey J. Hawkins, discussing the evolution of bird song (1922, p. 53) asserts that "when we turn from the study of individuals to the group of individuals which has assumed the rank of subspecies then divergences are perpetuated." He mentions some typical evolved differences of utterance between subspecies. The theory is that they exist as fixed differences now, because the original tendency to departure from the type was uniformly expressed by the individuals of a *group.* The freak or exceptional songs "are not perpetuated in the life of the species nor in subspecies. They are lost with the individuals." I am proceeding on the not too unreasonable assumption that my two aberrant Brown Towhees represent a "group." It seems not improbable that, since two individuals with similarly divergent songs have come to my personal attention, there must be others which have not. I base my assumption on the fact that the two songs are alike, not in one respect (which might be accidental) but in several respects, which I shall mention presently. This points to something deeper and more lasting than individual eccentricity.

We know that a Brown Towhee hatched say in Humboldt County behaves, looks, and *is* "like" another Brown Towhee hatched in Monterey County. It is three hundred miles from Cuddeback to Jolon, but the Brown Towhees of each locality are more nearly alike than any two randomly chosen humans of the same race. Why? Because both individuals—though they, nor their parents, never have come in contact—partake of the specific essence of *Pipilo crissalis crissalis.* Nothing has gone from one to the other, or even from any ancestral *Pipilo* to them. Yet they are what the ancestral *Pipilo* is, in size, shape, color, mannerisms, voice. And, since they are alike in these essentials why should they differ in the essential of song-improvement? "Germ-cells", says Charles Otis Whitman (1919, p. 179), "behave alike in development, not because anything is transmitted to them, but because they represent *identical material and constitu-*

tion, and are exposed to essentially like environmental conditions." Is not the manner of song modification as much "identical material" of the Brown Towhee as is his brown coat or his mincing step as he forages in the grass? Is it not as natural that two individuals of a species should behave alike in improving as in possessing a song? The facts impressing me as significant because of their appearance in both of our towhee songs, are as follows:

1. The fact of elaboration.
2. The fact of elaboration through imitation.
3. The fact of elaboration through adding the imitated syllables at the end.
4. The fact of the comparative musical quality of the imitated syllables (as contrasted with the hard metallic quality of the notes in the "bouncing" song).

Certain ideas, of not too speculative a character, I hope, to be of some value, occur to me in connection with each of these four points.

1. *The fact of elaboration.*—It would seem that all birds who possess songs possess a tendency to elaborate or improve their songs; that is, to render more perfect their songs in the number, kind, and arrangement of notes. The finest singers among birds (so considered from the human point of view, and so too in actuality, I believe) are the producers of comparatively prolonged and complex musical effects. The evolution of bird song evidently proceeds from simplicity to complexity.

The simplest songs are those sung in short set form—running automatically in pre-established grooves. Within this definition, the simplest are those containing only one kind of sound. Finally, these two essentials being complied with, the simplest are those in which the one kind of sound involved is derived from the call- or alarm-note of the singer. Charles A. Witchell describes (1896, pp. 49-50) the songs of some fifteen birds, and remarks (p. 53), "In all the above-mentioned British species, and in some of their allies, which represent many avian races, the males court the females partly by the repetition of notes which we observe to be employed in other circumstances as call-notes; and in some species these notes are repeated so rapidly that a phrase is constructed. But some species have never advanced beyond the mere repetition of their call-notes." He expresses the belief (p. 58) that "songs were, at first, mere repetitions of call-notes, or possibly of defiance-cries, which have since been more rapidly uttered and varied, with the result that novel strains have been slowly developed." Among American birds two species occur to me off-hand as possessing songs more or less of this type. One is the Linnet, whose zig-zag, twittery warble is found on analysis to be composed partly of the call-note, or chirp, of the species. The other is the object of our present study, the Brown Towhee, whose normal song is composed wholly of repetitions of its alarm-note.

The typical "bouncing" song of the Brown Towhee, though according to our definition very simple, is doubtless even at that an elaboration of something still more simple, which in turn we must trace back through imperceptible stages to its humble origin, the alarm-note. The alarm-note (in the Brown Towhee as in other song-birds) must have existed before the song. Without bothering ourselves here about the origin of alarm- and call-notes (whether to be found in spasmodic muscular contractions acting upon the trachea in moments of excitement or of effort, or to some necessity of emotional expression for purposes of social control [see Wallace Craig, 1908]) we can feel pretty sure that the song is the most advanced form of expression in the bird's vocal his-

tory. It is elaborated from pre-existing elements, and is in no wise conceivable as in itself an original form of utterance.

The above considerations cannot pass through the mind without bringing in their wake the question: Is there any useful purpose served in this fact of song elaboration? Does it get the bird anything it lacked before? Is an essentially songless bird a loser in the give and take of avian existence?

Witchell makes certain observations (p. 177) suggesting the possibility that in the strict social economy of bird life the elaborating tendency may be somewhat counteracted by some necessity of preserving the specific identity of both calls and songs for reasons of practical convenience. The calls certainly, and the songs almost as certainly, might lose their usefulness in a social sense if modified at the whims of individuals. But evidently individual modifications are not passed on and therefore do not become of racial importance. The slowness of organic evolution makes it plain that there must be deep-seated in birds, as in the rest of nature, an instinctive obedience to some principle of conservative action.

But just as plainly there is an instinctive recognition of the necessity of progress. That must explain why individuals get "freakish". But their freakishness avails the race nothing unless they get that way in groups, following a *racial* behavior pattern. It is a truism to say that life—including vocal bird life—implies within itself the need for growth, advancement. But even that does not satisfactorily explain why a bird improves its song: it merely says that he does because he does. Now, the following, I admit, is a theory. Given the primal necessity for song improvement, existing merely because the bird is *alive*, I believe that it carries with it and confers upon the bird, as a result of itself, some appreciation of itself. The bird, in other words, somewhat *appreciates* the work which it finds itself to have done in the line of song improvement. It is not unaware of its achievement, and is "interested" or "pleased" or even "elated". On what grounds? Because it feels the results to be useful or practical? I doubt it. Because it feels them to be pleasing—that's all. Insofar as vocal bird life is concerned, I cannot help believing that we are concerned with what Lloyd Morgan has called (p. 270) "the germs of aesthetics". In his lowly way—on his "perceptual" rather than "ideational" plane of mental development—why should not a bird, in his leisure moments and under the spell of the mating season, feel an impulse to outdo himself in song—an impulse heightened by his realization of results spontaneously achieved by mere virtue of living? I believe that herein lies the explanation of the evolution of bird song. The songster is an esthete. I shall say more of this beyond.

2. *The fact of elaboration through imitation.*—Upon analysis of the situation it becomes apparent that bird song can be elaborated in no other way than through imitation. The "mimetic origin of bird song" (see Rhoads, 1889) is not only the reasonable, but the inevitable origin—only we must here guard against understanding "origin" to be a synonym of "cause". Mimicry is certainly not the cause of song-development: it is the *method* employed—the only method, in the nature of things, available. Elaboration *is* imitation; though in many cases songs that we consider "original" may have been in reality copied from singers that have ceased to exist in the age and environment of the imitator (see Witchell, p. 227). It is, after all, quite natural that a species, working out its song through its individuals, should seize upon and utilize the notes of

other species. Where would the bird find material for its song if not through *hearing* it? New phrases in the human language are made up of old words, and the same thing holds in bird song. It would be impossible for a bird to "invent" or "originate" a song. But all of this is too obvious to require discussion. The elements of bird song must have pre-existed; they must have been first heard and then reproduced. In their ultimate analysis they must have been physical, derived from insensate sources and inanimate features of earth and the elements, or the involuntary and accidental movements of primitive voiceless things, animal or vegetable. But all of this is "another story" for which see Witchell (pp. 181-186). Coming back to what Witchell calls (p. 177) "that imitative tendency which is latent if not evident, in nearly every bird with any pretensions to a song"—let us ask again: What does song imitation (or elaboration) mean (if anything) in the social economy of bird life?

If the bird is in no wise responsible for anything that he does but is sustained in all acts by an ultimate cause, then it is perhaps vain to look for the meaning in his behavior. But if we conceive that the bird displays some consciousness of its own behavior, some intelligence of its own (even though it be a mere image of the greater intelligence, an effect worshipfully endeavoring to ape its cause) then we can at least observe the behavior of this "image" and come to some conclusion as to what *it* is trying to do and why. If we form some estimate of the bird's apparent intelligence, as we see it at work, we may gain a hint as to the true purpose that is being expressed or reflected therein.

To take an example of imitation in its most striking manifestation, let us turn for a few moments from the Brown Towhee to the Mockingbird. This bird, according to Lloyd Morgan (p. 193) represents a stage of "intelligent imitation, arising in close connection with interest in the doings of others . . .". The three stages (as illustrated by the human child) are, "First, the instinctive stage, where the sound which falls upon the ear is a stimulus to the motor-mechanism of sound production. Secondly, the intelligent stage of the profiting by chance experience. . . . If we assume that the resemblance of the sounds he utters to the sounds he hears is itself a source of pleasurable satisfaction (and this certainly seems to be the case), intelligence, without the aid of any higher faculty, will secure accommodation and render imitation more and more perfect. And this appears to be the stage reached by the mockingbird or parrot. But the child soon goes farther. He reflects upon the results he has reached . . .". Professor Morgan adds that "of intentional and reflective imitation there is at present no satisfactory evidence in any animal below man".

Let us examine a typical song of the Mockingbird (*Mimus polyglottos leucopterus*), one recorded by me in the San Joaquin Valley, near Mendota, Fresno County, California, June 20, 1918. During a period of listening I recorded eleven "original" or un-imitated and nine imitated parts. The imitated parts, rendered in a manner that ranged from fair to perfect, were unmistakably referable to the following birds: Traill Flycatcher, English Sparrow, Western Belted Kingfisher, Ash-throated Flycatcher, Sparrow Hawk, California Cuckoo, California Shrike, Red-shafted Flicker, and Killdeer—all, by the way, birds present in the habitat of this individual Mocker. In addition to these notes the bird uttered several others which suggested the notes of other species without being quite enough like them to be fairly called imitations.

Whenever I hear a Mockingbird sing I cannot help wondering just where, if anywhere, the line can be drawn between the second and the third stage de-

scribed by Professor Morgan. In taking a "pleasurable satisfaction" in "the resemblance of the sounds he utters to the sounds he hears" is not something akin to reflection on the results necessary? Moreover, are the performances of the Mockingbird and the Parrot analogous? I do not believe they are. The mimicry of the Parrot is certainly associated with different instincts and emotional conditions than is that of the Mockingbird; for the Mockingbird—the *male* Mockingbird, let it be pointed out—is uttering his *song*, which, as is commonly agreed, is an emotional expression intimately connected with the sexual instinct, whereas, unless I am much mistaken, the "talking" of the Parrot rests on no such basis and bears no relation to sex feelings, but is more akin to mimicry as an instinct in itself such as we perceive in the actions and gestures of monkeys.

The Parrot undoubtedly does not rise above the second or "intelligent" stage, if indeed he attains it at all. He is *forced* to imitate, he is *taught* to imitate; he is removed from his natural environment, confined in a cage, and worked upon by designing minds that happen to know that his trachea is naturally suited to the production of human-like sounds. The Mockingbird on the other hand carries on his mimicry in the wild state. He needs no urging—sex is his urge—and, unless his behavior is very misleading, he not only takes a "pleasurable satisfaction" in the results of his vocal efforts, but he does so because he *dwells upon* those results with pardonable appreciation. After having, on so many occasions, noted the characteristic manner in which the Mockingbird "plays with" imitated sounds, rolling them about on his tongue one might say, as with the greatest gusto, trying them over and over, sometimes with little variations in inflection and intensity, seeming to be constantly experimenting with his material—I, for one, cannot avoid thinking that his mental state is characterized by a sort of reflectiveness.

I do not believe, however, that any practical considerations mark the bird's reflectiveness. I do not believe that the social economy of his life in any way determines or is determined by the results achieved. I believe that the bird's interest in his own mimicry is "artistic"—and the social economy can take care of itself as best it can. My reasons for holding the above beliefs are as follows.

The Mockingbird, as typically shown in the above described song, imitates a comparatively large number of birds, and he imitates them with sufficient skill to deceive them, provided they are susceptible to that sort of deception. Of the imitated birds concerned in our particular record, five are permanent residents and four are summer residents in the habitat of the imitator. In the summer they are all more or less prominent "citizens" of that part of the Lower Sonoran Zone where our Mocker is found. And our Mocker, without any too fine discrimination or apparent regard for the "feelings" of his neighbors, mimics them right and left, appropriating any and all sounds that are persistent enough to impress him at all. The affair is of social significance in that the whole community is involved. The Mockingbird drags all his most prominent neighbors into the performance and holds them up to mimicry. Are his neighbors aware of this fact? If so, does it make any difference to them, and how, if at all, do they re-act? And the mimic himself—what does he derive from the performance? Does he gain therefrom anything in a practical way for himself and for his species, especially for his mate? Or, on the contrary, does he cause himself and his kind only trouble and confusion?

So far as appearances go this incorrigible mimic is easily holding his own in "the struggle for existence." If his mimicry causes confusion among any of the species mimicked it apparently does not come back on him or his race. His mimicry, so far as I, myself, have ever observed, or read, or heard, does not cause confusion among his own kind. But I doubt if he *gains* anything beyond a certain "aesthetic pleasure"—an emotion doubtless shared with his mate, but not otherwise having any "social" significance.

It might be claimed, of course, that the Mockingbird "gets away with" his promiscuous mockery solely because of his pugnacious disposition and ability to take care of himself, whereas a less able bird, say a Goldfinch, might court death if it had the temerity to imitate a Sparrow Hawk or a Shrike. Personally, however, I cannot easily picture a Goldfinch* (assuming it to be an imitative bird) meeting its death as the result of mocking a Shrike. The Shrike is not a gregarious bird, and the only call it might conceivably respond to (that is, fly towards) would be the sex-call of its kind. It would then respond in a wooing, not in a killing, mood.

Let me concede the possibility, however, that it might, on discovering its mistake, change its mood, and kill the Goldfinch. Such events would tend to eliminate from the racial song of the Goldfinch any and all notes copied from birds that prey on the Goldfinch, since, in each case, the individual doing the imitating would perish. But even though this may be the case with some birds, it does not seem to be with the Mockingbird, whom we may observe imitating "dangerous" birds with apparent impunity.

It seems to me utterly absurd that a Shrike should "imitate other birds for the purpose of attracting them within range of its attack"—a habit that Yarrell, as quoted by Witchell (pp. 173-174), attributes to the Great Grey Shrike. It very well may be that the Great Grey Shrike has imitative powers; and undoubtedly this bird is capable, in certain ways, of profiting by chance experience. But I cannot picture this as one of the ways: it is endowing the bird with too much intelligence.

I do not believe, then, that practical or economical considerations enter into the choice of sounds to be imitated by the Mockingbird or by any bird. The behavior of imitating birds does not indicate such to be the case.

There are two main factors, however, that I believe to be reasonably borne out by observable facts, influencing the choice of sounds to be imitated. In discussing these factors, let us return to the Brown Towhee as being a bird in the simpler and early stages of song evolution and as furnishing therefore a less complex "test case" for our purposes than the Mocker. To make our case definite let us keep in mind as our individual example the Brown Towhee of the Chalk Peak region of the Santa Lucias who imitated the Western House Wren. Let us make a note of the fact that he belongs to a non-migratory race. The association where I found him was arid Transition in the yellow pine belt. It is assumed that a bird is most influenced by the sounds of its environment during its own song period, that is, during the spring and summer months. With these ideas in mind, it can be demonstrated, I believe, that the number of bird-notes available for imitation in the habitat of our Brown Towhee is far more limited

*Since there are no American birds besides the Mockingbird in the evolved stage of mimicry, I am forced to choose as my example a non-imitative bird. In contrast to the derth of mimics in this country see Witchell's enumeration of imitative British birds (pp. 190-229).

than one would probably assume off-hand. The factors influencing his choice of notes are as follows:

(1) Persistency of the sounds in the imitator's environment. Such persistency determined by:

(a) Seasonal status of "subjects" of imitation. All transients and irregulars would be eliminated since their notes would not persist in the imitator's environment for a sufficient number of weeks nor would they persist during the imitator's impressionable period.

(b) Associational preferences of subjects. Those of extremely local or restricted range would be eliminated. This counts out the Bell Sparrow (which I found only on the sagey west slope of Chalk Peak); the Western Bluebird, the Pine Siskin and the Linnet (which showed a decided preference for the west slopes down toward the Redwoods); and the Violet-green Swallow and Martin (whose aerial habits kept them a good part of the time out of hearing of our imitator).

(c) Numerical distribution of subjects. Those of rare or occasional occurrence would be eliminated, namely, the Slender-billed Nuthatch, the Cabanis Woodpecker, the Nuttall Woodpecker, Western Kingbird, the California Thrasher, the Cassin Vireo, the Lawrence Goldfinch, the Black-throated Gray Warbler, the Western Gnatcatcher, the Point Pinos Junco, Mountain Quail, the Tawny Creeper, Mourning Dove, Audubon Warbler.

(d) Time of activity of the subjects during the twenty-four hours. Birds of nocturnal or crepuscular habits would be eliminated, namely, the Poor-will and any owls that might inhabit the region.

(e) General vocal strength of subjects. The following weak-voiced birds are eliminated: Creeper, Pygmy Nuthatch, Bush-tit, Bluebird, Siskin, Anna Hummingbird, Allen Hummingbird, Western Gnatcatcher.

(f) General vociferousness of subjects. The Buzzard is eliminated as being silent.

(g) Uniformity of utterance on the part of the subject. The Plain Titmouse is too versatile; does not stick long to any one note. The Thrasher, Black-headed Grosbeak and Purple Finch (whose persistent utterances are their songs) sing in a manner too long, "diffuse" and variable to allow any one sound to outstand.

(2) Physiological conditions connected with the peculiar nature of the syrinx and other vocal apparatus of the imitator. Obviously certain types of sound could not be managed by the comparatively unelastic and unpracticed syringeal membrane of the Brown Towhee. Thus at least two classes of sound would be physiologically unmanageable:

(a) Too voluminous sounds, such as those of the California Quail, Band-tailed Pigeon, and California and Crested Jays (heavy *chup-chup-chup* notes of each, and the common *zhrae* of the former).

(b) Too low sounds, such as those of the Mourning Dove and Band-tailed Pigeon.

Applying the above tests to all of the birds recorded by me during my stay in the Santa Lucia Mountains, I find that I have eliminated all but nine. These nine represent birds which have one or two utterances to be heard persistently all day long every day during the summer months. Following is a list of the birds and their notes:

California Woodpecker	"yarcob" and "cracker"
Red-shafted Flicker	"klee-yuh"
Ash-throated Flycatcher	"kippy" and "kip-preer"
Olive-sided Flycatcher	"peevue" and "puip-puip-puip"
Western Wood Pewee	"beeeezzzz"
Spurred Towhee	"thwaaaa" and song
Western Tanager	song
Western House Wren	song
Wren-tit	common "tattoo" call

These are thirteen sounds forcing themselves incessantly upon the Brown Towhee's attention. It is reasonable to assume, then, that they are the sounds most in line for imitation. The question is: *Why is the House Wren's song the sound chosen?*

"One of the most extraordinary facts of our life," declares William James (p. 217), "is that, although we are besieged at every moment by impressions from our whole sensory surface, we notice so very small a part of them. The sum total of our impressions never enters into our *experience*, consciously so called, which runs through the sum total like a tiny rill through a broad flowery mead. Yet the physical impressions which do not count are *there* as much as those that do, and affect our sense organs just as energetically. Why they fail to pierce the mind is a mystery . . .".

This was written concerning human experience, but I do not see why it is not just as applicable to bird experience. The factor of *attention* certainly enters into the situation. The Towhee "just naturally" attends to certain sounds and disregards others. As between a dozen sounds equally thrust upon his ears, he is for some reason *interested* in certain ones more than others, and therefore all the others are shut out of his conscious consideration.

To quote from Lloyd Morgan: "We often say . . . that *interest* guides behavior in this direction or in that. But such interest must not be regarded as an impelling force; it is an attribute of the conscious situation, more or less suffused with feeling-tone. It is not easy to define; but it seems to take on its distinctive character when representative elements contribute what Dr. Stout terms 'meaning' to the conscious situation".

When a Brown Towhee (acting for and in accordance with its race, due to the identity of germ-plasm in all members) selects the song of a House Wren rather than any one of the other eleven sounds equally forced upon its sense of hearing, the song of the House Wren must have some special *meaning* over and above the other sounds. Let me ask even again: Has this meaning anything to do with the social economy of Brown Towhee life? Is it a matter of life and death that certain types of sound shall be shut out of the conscious attention, and others heeded? And again let me reply that I do not believe any such thing. When it is becoming so questionable that even a human being is born with anything within him that causes him to act for the advantage of his own kind, why should we expect it in birds? Human beings show "interests" in things, but these interests are commonly in no way connected with race progress and are not even vital to the individual. I mean, it makes no killing difference if a wavering boy finally chooses radio operating instead of architecture. Nor does it make any more difference whether a Brown Towhee chooses to imitate a Wren song or a Flicker call. Insofar as a choice of musical sounds is concerned it does not seem reasonable that anything is at work except a sort of *taste*. Human beings like and pay attention to certain musical compositions above certain others. So does the Brown Towhee. In selecting the song of the House Wren he is guided, in my opinion, by a lowly sort of aesthetic feeling. Xenos Clark believes that birds have "an ear for music" and that in evolving their songs they follow a harmonic pathway, which, however, happens to be for them the pathway of least resistance. The primitive bird, he says (p. 212), "sang to please himself or his mate, and the most pleasing combination of notes was that most easily heard; the combination producing least friction and securing the

most economical action of the sound-receiving apparatus". This places the matter on a purely mechanical and automatic basis, although the *results* are what we may call aesthetic. The results, I believe, are not unappreciated by the singer, and he re-acts with a more conscious exercise of "artistic taste". I believe, in short, that the actual *superior musical quality* of the House Wren's song, consciously appreciated by the Brown Towhee, is the final factor in the selection of *it* instead of the harsh "cracker" of the California Woodpecker, the yelping "klee-yuh" of the Flicker, and other more or less unmusical sounds in the list. But for further discussion of this theory I refer my reader to the final section of this paper. And now let me pass to the next division in order, namely:

3. *The fact of elaboration through adding the imitated syllables at the end.*—An analysis of the two Brown Towhee songs which are the subject of this paper reveals that they are the stereotyped song of the species *plus* some acquired syllables. The acquired syllables in each case occur *at the end* of the stereotyped song. Now, this manner of elaboration is, it seems to me, the easiest and most natural one—the one which a bird taking its first clumsy steps in the direction of song improvement would of necessity employ. Even human beings are inclined to have "single-track" minds that cannot easily accommodate two thought-trains abreast. They wish to do "one thing at a time"; otherwise they are apt to become flustered and end by doing neither of the two things intended. It seems perfectly natural that the Brown Towhee should sing the old familiar song *first*, and then give his undivided attention to innovating. Reverse this technique and we immediately picture the bird so flustered at his attempt to *plunge directly into a radically different type of utterance* that he would not be able immediately to pass on to the regular syllables. The accustomed song is the momentum, the encouragement, that carries him into the less familiar performance.

Witchell (p. 192) quotes Bechstein to the effect that the (European) Redstart "can improve its song . . . by adding to it parts of the songs of birds that are found near it". He vouches for the fact that Bechstein "accurately records that the Redstart *adds* the notes of other birds, for the imitations of this species are uttered at the end of the ordinary strain, to which they form a kind of *sotto voce* suffix".

The Redstart, then—even though mimicking a goodly number of other birds (Witchell, p. 218)—nevertheless *adds* the mimicked notes amateurishly (as I may call it) at the end, even as does the Brown Towhee. Both Redstart and Towhee, it would seem, are in the *practice stage* of mimicry, as opposed to the more advanced stage attained by the Mockingbird who interpolates imitated passages at will with all the assurance and independence of a human improviser. In England, it would seem, there are a number of such accomplished and evolved mimics, including the Thrush, the Robin, the Skylark, the Starling, the Sedge-Warbler, and the Nightingale (Witchell, pp. 194-219). In fact, one gathers the impression that mimicry is quite the thing in the best English song-bird circles!

4. *The fact of the comparative musical quality of the imitated syllables.*—The fact that the imitated portions in *both* of our two "off" Towhee songs, though borrowed from two different birds, nevertheless both contained a liquid *r*-sound and a vowel-sound of decidedly lower pitch than the piercing, high-frequency *i*-sound emanating from the traditional *tip!* of the species, suggests the idea that, other things being equal, the Brown Towhee is *interested in* sounds of a more fluent and of a softer nature than those used in his ordinary song.

Let us also here note, as of possible significance, the fact that the only *other* utterances possessed by the Brown Towhee besides his "bouncing" song are: (1) A succession of eight or nine rather distressed-sounding squeaking sounds, somewhat as one might squeak with one's lips, and (2) a faint high attenuation of what we may call the *family* "*tseep*" of the Fringillidae, some version of which is found in most of the sparrows. Neither of these two "other utterances" are in the least musical. Is it, then, endowing our bird with too much "aesthetic" sense to presume that through the ages he has been listening with something akin to admiration to sounds that were more musical than his own? Some people may object that sounds which are considered "more musical" by the cultivated human sense would not necessarily be so to the senses of lower animals. I do not agree with this objection. I believe in the *absolute superiority* of certain sounds over others. Sounds that we call musical are not so because we consider them such, but we, being the most cultivated hearers are the best judges of the *fact*. The same fact is in the course of evolution bound to be realized by other animals. In the Santa Lucia Brown Towhee's choice of what is *obviously the most musical sound of the thirteen sounds available for imitative use* I believe we see something not unrelated to *aesthetic taste*.

Let me state my concluding remarks in the form of three points, as follows.

(1) The CAUSE of bird song evolution is the bird's *aliveness*.
(2) The METHOD is of necessity *mimicry*, which in itself makes for song-elaboration.
(3) The RESULT, therefore, is:
  (a) an improved song;
  (b) the bird's pleasurable awareness of this fact;
  (c) the self-stimulation to still further improvement, resulting in a more conscious or deliberate employment of the mimicry METHOD through the exercise of MUSICAL TASTE.

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NOTES ON THE YELLOW-BILLED LOON

By ALFRED M. BAILEY

THE following notes on the Yellow-billed Loon (*Gavia adamsi*) were made in southeastern Alaska while I was carrying on field work for the Biological Survey and are published with the permission of Dr. E. W. Nelson, Chief of that Bureau.

The migration of the Yellow-billed Loon has long been one of the problems of northern ornithological work and has been dealt with by numerous authors, Dixon (Auk, October, 1916) and Bent (Life Histories of North American Diving Birds, 1919) being the latest. The presence of this species in southeastern Alaska has been authenticated by the taking of a few specimens, but without positive notes for any extended period. Mr. George Willett has spent considerable time in the vicinity of Craig and Sitka since 1913, and has recorded the species but twice; one was seen in the winter of 1919, and an immature specimen was collected near Wrangell during the fall of 1920. Mr. Gray with 18 years active field work has never collected a specimen, although he has seen it a few times and has a specimen taken from a fish trap.

As I had rather exceptional opportunities for observing the water birds in southeastern Alaska during 1920, I was able to collect a series of nine of these rare loons and make many sight records ranging throughout the year except during the months of July and August. I first saw the yellow-bills at Oliver Inlet, on Admiralty Island, February 6. In my report for the trip I listed them as "two abnormally large loons" which were noted flying up the Inlet. I identified these as Yellow-bills, but as I had never encountered the species prior to this time, and do not believe in sight records for rare species when one is not actually acquainted with the bird, I allowed the record to rest for future verification. I next saw an immature in Rocky Pass, between Kuiu and Kupreanoff islands, March 4; and again, the next day, while bucking a heavy wind in a blinding snow storm in the boat *Auklet* in Keku Straits, one came within a few feet of the bow of our boat. I again saw the species in the harbor at Wrangell on April 23, although I again failed to bring the bird to bag. It is to be emphasized that I identified these birds as Yellow-billed Loons at the time, but had no specimens to back the records.

Any one who has attempted to collect loons knows that the element of luck plays a far greater part than skill, and if he guesses wrongly as to the direction a loon takes when diving the first time, he might as well give up the bird. It was not until May 25 that I secured any specimens. I saw a fine adult bird off Marmon Island, the lower point of Douglas Island; and shortly after, in Gastineau Channel, I collected a big female in full plumage (length, 840 mm.; tarsus, 90; tail, 70; wing, 385). The ovaries of this specimen were undeveloped. Early the same morning, as we came down Stephens Passage, along Douglas Island, at least thirty loons were seen, but it was so foggy I could not identify them. Yellow-bills were next seen June 10 between Douglas and Admiralty islands, in Stephens Passage. There were three of them, two adults and an immature, of which I collected an adult and the immature. These birds appeared very conspicuous as they raised partly out of water, with wings outspread and strikingly colored beaks thrust skyward. Two other

large immatures were sighted a mile farther on, but I did not collect either. June 11 two immature loons were noted off Point Couverton, completing my records of the species for the spring months.

My first fall records were made in Seymour Canal, Admiralty Island. This broad inlet extends for more than fifty miles on the inside of Glass Peninsula, and is one of the favorite schooling grounds of herring. Consequently it is an especially favorable place for loons. During the heavy rains of September 30 and October 1, at least eight yellow-bills were noted, two adults the thirtieth, and six adult and immature birds the first. Again, on October 7, off Young's Bay in Stephens Passage, seven adult birds were seen in one flock. They were so gorged with fish they could not (or did not) rise from the water, but went pattering over the surface, as murres sometimes do, until they were out of sight—all but one big male which I collected. This fellow was literally crammed with rock cod. (I have found that loons in flocks usually prefer to escape by flying, while single birds usually dive.) An immature was seen within a few miles; and on October 10 I took an adult off Point Couverton, while eleven others were positively identified the same day, between the Point and Glacier Bay, in Icy Straits, as well as two others within the confines of the Bay. Another immature was collected October 24 in Chatham Straits, and another noted; and an adult was taken at Killisnoo October 26, and another seen.

The yellow-bills, according to my experience during the year 1920, can not be considered as rare. They are extremely wary and give boats a wide berth, so one is apt to overlook them unless watching carefully. On October 10, while going up Icy Straits, the birds started for the shadows of the shore or the center of the channel to avoid us, when we were still five hundred yards away. With average light, it is almost impossible to identify yellow-bills, without the aid of binoculars, much more than gun-shot away; and for that reason I believe they have been overlooked by collectors. When a specimen is in the hand, the large size and colored bill seem so apparent that one could not fail to notice them; but in the water, especially in bad light, their size shrinks remarkably, and they do not look different from Common Loons. The last two specimens I collected, I was not positive of having yellow bills until I had the birds on the boat, in spite of the fact I had "worked" on the adult for an hour.

In flight, however, they can be told by their size. If the light is at one's back, these great, heavy-bodied birds stand out with startling clearness,—the long, arrow-like neck is thrust outward and the wings drive forward at tremendous speed. Outlined against the fleecy clouds, with snow-topped mountain ranges serrating the horizon, and ice-bergs of wonderful blueness in the channel ahead, these wanderers from the Arctic regions complete Nature's composition of an otherwise unfinished work of art.

Colorado Museum of Natural History, Denver, Colorado, April 19, 1922.

DISTRIBUTION OF *MOLOTHRUS ATER* IN CALIFORNIA WITH THE DESCRIPTION OF A NEW RACE

By DONALD R. DICKEY and A. J. VAN ROSSEM

DURING the late spring and summer of 1920, the writers took a series of cowbirds at Buena Vista Lake, Kern County, California. Pressure of other work prevented careful diagnosis at the time, and since birds of that region had previously been referred to *Molothrus ater obscurus*, that name was tentatively applied to these specimens. On further examination this series showed such a definite departure in characters from those exhibited by a large collection of *obscurus* from the Colorado Desert and adjacent regions, as to make a thorough analysis of the status of cowbirds in California seem advisable.

With this end in view, we have assembled or examined all of the material available in the Museum of Vertebrate Zoology and the Museum of History, Science and Art, together with many individual specimens gathered from private sources. Our thanks are due not only to those in charge of the ornithological collections of the institutions mentioned above, but also to the several private collectors who have so courteously placed their material at our disposal.

The resultant data has served to emphasize the fact that much remains to be done in the way of systematic collecting even in a State that has been as thoroughly canvassed as California. In the present instance there is adequate material from southern California, north to Mono Lake on the east, to Merced County in the San Joaquin Valley, and to Oxnard, Ventura County, on the Pacific Slope. North of these points we have been able to trace only a single specimen from the Modoc region, a stray migrant from the Farallon Islands, and two non-breeding birds from Santa Barbara County. Cowbirds are known to occur in fair numbers at various intermediate points, but specific records seem unexpectedly scarce and specimens lacking.

A general impression seems to have sprung up that cowbirds have only recently invaded California. It is unquestionably true that their numbers have increased greatly during the past few years, but in our belief this is due simply to natural increment rather than influx, and is adequately explained by the increasingly favorable conditions that have inevitably resulted from the present extensive development of dairying, truck-gardening, and irrigation projects in general. So far as we can determine there is no reason to suppose that Cowbirds, in small numbers, have not always been residents of the area. J. Grinnell(1) and Edward Wall(2) have already made some very pertinent remarks on this subject.

Molothrus ater obscurus (Gmelin)

Dwarf Cowbird

Range in California: Southern California, from the Arizona line west to San Diego; north over the Colorado and Mojave deserts to Death Valley, the Panamint Mountains, and Independence, Inyo County; north through the San Diegan district to the vicinity of Ventura and, in winter at least, to Goleta, Santa Barbara County. Specimens examined (approximately 150) from the

(1) Univ. Calif. Publ. Zool., 5, 1909, pp. 275-281.
(2) Condor, 21, 1919, p. 209.

following localities: Imperial County: Calexico, Bard, Lano, Potholes, Pilot Knob; Riverside County: Mecca, Neighbors, Riverside; San Bernardino County: Lavic, Yermo, Victorville, Colton; Inyo County: Death Valley, Panamint Mountains, Independence, Shoshone; San Diego County: San Diego, National City, Borego Springs, Vallecito; Orange County: Anaheim Landing; Los Angeles County: Baker, Los Angeles, El Monte, Pasadena; Ventura County: Oxnard; Santa Barbara County: Goleta.

REMARKS: Broadly speaking, the life zone occupied by *obscurus* is Sonoran, with centers of abundance in the Lower Sonoran Zone along the Colorado River, at desert oases, such as Mecca, and in the irrigated sections of the Imperial Valley. The race is probably resident over its entire California range; certainly so in the southern part of the State. Specimens from the northern part of the San Diegan District are intermediate toward *californicus*.

Molothrus ater artemisiae Grinnell

Nevada Cowbird

Range in California: In summer, the east-central section of the State, from Death Valley, the Panamint Mountains, and Independence, north to Mono Lake; also the northeastern section, in the Modoc region. In migration, and in winter, widely distributed over most of the State. Record stations outside the normal breeding range are: Los Coronados Islands (Lower California), September 5; Farallon Islands, June 2; Borego Springs, April 30; Neighbors, October 14; Yermo, June 7; and Mount Bullion, December 27. The record from the Sacramento Valley cited by Baird(1) may pertain to this form or to *californicus*. Of the 49 specimens examined, 26 are from the following California localities: Los Coronados Islands (Lower California); San Diego County: Borego Springs; Riverside County: Neighbors; San Bernardino County: Yermo; Inyo County: Furnace Creek Ranch, Death Valley, Panamint Mountains, Independence, Laws; Mono County: White Mountains, Mono Lake, Oasis; Modoc County: Alturas; Mariposa County: Mount Bullion.

REMARKS: As a breeding bird, the Nevada Cowbird is much more widely distributed zonally than either of the other forms occurring in California, since it ranges from Transition (Alturas), through Upper Sonoran (Mono Lake and Owens Valley), to extreme Lower Sonoran in Death Valley. Moreover, this race is distinctly migratory, whereas *obscurus* and *californicus* appear to be nearly or entirely resident. The sporadic occurrences during the summer at Yermo and on the Farallones can be most logically accounted for by considering these individuals as late or strayed migrants.

A certain amount of intergradation takes place between *artemisiae* and *obscurus* in Death Valley, the Panamint Mountains, and Owens Valley, particularly in the southern part. In addition, certain rather small examples of *artemisiae* from Mono Lake are undoubtedly accounted for by an infusion of *obscurus* blood. However, the blending of the two races is by no means the gradual one which is generally found in the intermediate area between two subspecies. This very imperfect fusion of the two forms probably indicates either a recent invasion of the range of one form by the other, or else a recent simultaneous occupation by both forms of an area formerly uninhabited by the spe-

(1) Reports of Explorations and Surveys from the Mississippi River to the Pacific Ocean, 1853-56, vol. 9, pt. 2, pp. 524-525.

cies. Breeding specimens typical of both *artemisiae* and *obscurus* are at hand from Death Valley, the Panamint Mountains, and Independence. To add to the complexity of the material from this region, several of the intergrades (possibly hybrids would be a better term) are practically indistinguishable from *californicus*, and were they taken in the San Joaquin Valley, would pass as examples of that form. In this regard the present case is clarified, however, by the exact analogy detected some years ago among the horned larks by Dr. H. C. Oberholser(1). Briefly, the case may be summed up as follows: Where the two forms come together, a combination of their characters has resulted in a more or less typical reduplication, in certain individuals, of the characters of a third well-defined race occupying a distant and delimited area.

Molothrus ater californicus, subsp. nov.

California Cowbird

DIAGNOSTIC CHARACTERS: FEMALES: Compared with *Molothrus ater obscurus*, size larger, tail proportionately shorter, and tarsi and feet much heavier; coloration darker, especially below (more slaty), and streaking sharper and more conspicuous. Compared with *Molothrus ater artemisiae*, size smaller; streaking of under parts narrower. MALES: The proportion of wing to tail is practically the same in the males of all three races, but the larger size, heavier tarsi and feet, together with the greater bill size of *californicus* will serve as distinguishing characters when compared with *obscurus;* the smaller size, particularly of these parts, will differentiate the race with equal facility from *artemisiae*.

TYPE: Female adult, H 707, collection of Donald R. Dickey; Buena Vista Lake, Kern County, California; May 20, 1920; collected by Donald R Dickey and A. J. van Rossem; original number A. J. van R. 5366.

RANGE: In summer, the San Joaquin Valley of California, from the extreme southern end north at least to northern Merced County, and possibly north to include the Sacramento Valley; also east in favorable localities to the Sierra foothills, as at Weldon, Kern County, and Snelling, Merced County. Wandering west and south in the fall to Ventura County (Oxnard), and Santa Barbara County (Carpinteria), and in spring at least to Los Angeles County (El Monte). Specimens examined from the following localities: Kern County: Buena Vista Lake, Bakersfield, Weldon; Merced County: Snelling; Fresno County: Mendota; Santa Barbara County: Carpinteria; Ventura County: Oxnard; Los Angeles County: El Monte.

REMARKS: We have selected a female as the type because the differences between the several forms are (as is the case with certain races of *Agelaius*) more pronounced and uniform among individuals of this sex than among the males.

This form is apparently resident in the southern San Joaquin at all seasons of the year. In September, 1921, and in January, 1922, the junior writer found cowbirds almost, if not quite, as common in the vicinity of Buena Vista Lake as during the summer. No specimens were taken at these times, because for some reason the birds were extremely shy. A large series of fall, winter, and spring specimens taken outside the San Joaquin Valley fails to disclose any birds referable to this race, except those mentioned above. Intergradation with *obscurus* takes place in the northern part of the San Diegan District, for breeding birds

(1) Proc. U. S. Nat. Mus., 24, 1902, pp. 802-803.

from Los Angeles and Ventura counties are clearly intermediate in size and color. To the east, the Sierra Nevada Range forms an effective barrier to the interbreeding of *californicus* with either *artemisiae* or *obscurus*. Future collecting in the Sacramento Valley may disclose an intergradation with *artemisiae* in that region.

In working over the series of the present subspecies, it has particularly interested the authors to find this race apparently reaching its maximum development in wing length and in attenuation of bill on the South Fork of the Kern River. It is this same mountain valley which has produced *Agelaius phoeniceus aciculatus*, and it is of further interest to note that the distinctions which serve to separate *Agelaius p. neutralis*, of the San Diegan district, from *Agelaius p. aciculatus*, are paralleled in many respects by those which differentiate *Molothrus a. obscurus* from *Molothrus a. californicus*.

MEASUREMENTS

Molothrus ater californicus

FEMALES (all from California):

Coll. No.[1]	Locality	Date	Wing	Tail	Tarsus	Culmen	Depth Bill at Base
H 707*	Buena Vista Lake	May 20, 1920	93.3	64.6	23.0	15.1	9.9
H 708	Buena Vista Lake	May 20, 1920	94.2	63.4	23.4	15.0	9.2
H 709	Buena Vista Lake	May 20, 1920	96.0	65.4	24.3	14.7	9.2
H 719	Buena Vista Lake	May 21, 1920	95.3	65.8	23.4	15.2	9.9
H 720	Buena Vista Lake	May 21, 1920	94.0	64.4	23.2	14.5	9.4
H 721	Buena Vista Lake	May 21, 1920	94.1	62.2	22.8	16.1	9.2
H 722	Buena Vista Lake	May 21, 1920	93.8	64.4	22.8	14.6	9.6
J 798	Buena Vista Lake	June 13, 1921	94.0	63.4	23.3	14.7	9.3
J 905	Buena Vista Lake	July 8, 1921	94.4	59.5	23.2	15.0	10.0
J 906	Buena Vista Lake	July 8, 1921	98.3	61.4	24.5	14.4	10.5
20101[2]	Weldon	July 6, 1911	100.0	68.3	24.5	17.0	10.3
20102[2]	Weldon	July 6, 1911	96.0	66.7	23.0	16.4	9.7
21547[2]	Bakersfield	April 21, 1912	93.5	65.0	22.8	14.8	9.3
29186[2]	Mendota	June 12, 1918	93.2	63.5	23.4	15.8	10.0
		Minimum:	93.2	59.5	22.8	14.4	9.2
		Maximum:	100.0	68.3	24.5	17.0	10.5
		Average:	95.0	64.1	23.4	15.2	9.7

*Type
[1]Collection of Donald R. Dickey, unless otherwise specified.
[2]Univ. Calif. Mus. Vert. Zool.

Molothrus ater obscurus

Eleven breeding females from Imperial Valley, and five from the San Diegan District.

	Wing	Tail	Tarsus	Culmen	Depth Bill at Base
Minimum:	90.0	61.0	21.2	13.7	8.5
Maximum:	97.5	68.3	24.0	14.8	9.8
Average:	92.8	64.6	22.5	14.2	9.3

Molothrus ater artemisiae

One breeding adult female from Humboldt County, Nevada, and six from Harney County, Oregon.

Minimum:	96.0	64.3	25.0	15.6	10.3
Maximum:	104.5	70.4	26.8	16.6	10.8
Average:	101.0	67.2	25.9	15.9	10.5

Average of eight breeding females from Death Valley, Mono Lake, and Independence, selected as showing that *artemisiae* in nearly typical form occurs at these southern points (intergrades with *obscurus* being excluded):

100.4	67.8	25.3	15.8	10.3

Molothrus ater californicus

MALES (all from California):

Coll. No.[1]	Locality	Date	Wing	Tail	Tarsus	Culmen	Depth Bill at Base
H 702	Buena Vista Lake	May 20, 1920	107.8	75.2	25.5	17.6	10.4
H 703	Buena Vista Lake	May 20, 1920	108.5	75.4	25.4	17.4	10.0
H 704	Buena Vista Lake	May 20, 1920	103.0	72.4	24.0	18.1	10.0
H 705	Buena Vista Lake	May 20, 1920	105.1	73.0	25.0	17.0	10.5
H 706	Buena Vista Lake	May 20, 1920	105.4	73.8	24.6	17.5	10.1
H 710	Buena Vista Lake	May 21, 1920	100.0	73.0	25.0	17.8	10.6
H 711	Buena Vista Lake	May 21, 1920	103.5	71.2	25.3	17.4	10.8
H 712	Buena Vista Lake	May 21, 1920	100.5	68.5	23.8	17.1	9.4
H 718	Buena Vista Lake	May 21, 1920	102.0	70.0	25.5	18.0	10.4
H 728	Buena Vista Lake	May 23, 1920	105.0	72.4	24.0	17.7	10.0
H 825	Buena Vista Lake	June 2, 1920	102.2	68.7	26.2	17.1	10.1
H 826	Buena Vista Lake	June 3, 1920	106.2	73.1	25.7	17.6	10.4
J 816	Buena Vista Lake	June 19, 1921	102.4	72.3	25.4	16.6	10.1
19515[2]	Bakersfield	May 10, 1911	100.0	69.4	24.4	17.3	11.0
19516[2]	Bakersfield	May 10, 1911	106.4	78.1	25.4	17.6	10.7
20100[2]	Weldon	July 6, 1911	103.0	71.4	25.0	18.2	11.0
25623[2]	Snelling	May 29, 1915	100.0	69.0	24.3	15.7	10.0
29187[2]	Mendota	June 15, 1918	102.5	72.0	25.3	16.5	10.5
		Minimum:	100.0	68.5	23.8	15.7	9.4
		Maximum:	108.5	78.1	26.2	18.2	11.0
		Average:	103.5	72.2	25.0	17.3	10.3

[1]Collection of Donald R. Dickey, unless otherwise specified.
[2]Univ. Calif. Mus. Vert. Zool.

Molothrus ater obscurus

Twenty breeding males from Imperial Valley, and two from the San Diegan District.

	Wing	Tail	Tarsus	Culmen	Depth Bill at Base
Minimum:	97.5	66.3	21.0	15.6	9.3
Maximum:	106.5	77.0	25.0	17.0	10.9
Average:	102.1	71.0	23.7	16.5	10.0

Molothrus ater artemisiae

Ten breeding males from Humboldt County, Nevada.

Minimum:	111.3	73.6	26.0	17.0	10.6
Maximum:	118.4	82.4	29.0	19.5	11.6
Average:	114.3	77.6	28.0	18.0	11.2

Average of five males from Independence, selected as showing that *artemisiae* in nearly typical form occurs at these southern points (intergrades with *obscurus* being excluded):

110.3	75.4	27.3	18.4	10.8

Pasadena, California, September 22, 1922.

FROM FIELD AND STUDY

The Capture of Water-fowl in Fish Nets.—The recent note by Mr. Stanley G. Jewett[1] on the accidental capture of a White-winged Scoter (*Oidemia deglandi*) in a salmon net, is of particular interest in view of the fact that the Bureau of Biological Survey is giving attention to the use of nets to capture birds for banding purposes.[2]

As stated in the paper referred to in the accompanying foot-note, several forms of net traps have been successfully used, among them being the well-known "fyke" net. This contrivance is made by covering a series of four iron hoops, three to four feet in diameter, with cord webbing. When fully extended the hoops are about two feet apart, and the web cylinder thus produced is divided into two chambers by means of web funnels. The first of these has a large mouth while the second is much reduced. Short wings or guides of webbing are extended from the mouth of the trap and the whole affair is held in place in shallow water by long stakes forced into the mud.

In the marshes of the Illinois River these nets are used extensively for the capture of carp, buffalo, and other fishes, an energetic fisherman frequently running a line of forty to fifty "fykes". The nets are placed in areas where large numbers of ducks gather to feed, and it is common to find half a dozen mallards or pintails in a single net. During March, 1922, while engaged in banding work in this region, I made a practice of trying to beat the fisherman to the nets that were set in my neighborhood for the purpose of securing any ducks that might have been caught. Pintails were most frequently taken and it was noticeable that they were usually caught in flocks of four to six, indicating that they fed in small groups and were strongly inclined to "follow the leader".

In this connection, mention may also be made of a recent "return" from a Buffle-head duck that was banded by Mr. Verdi Burtch, at Branchport, New York, on April 6, 1922. Eleven days later (April 17) the bird was found entangled in a herring net in Georgian Bay, near Collingwood, Ontario.

The problem of evolving suitable methods for the capture of diving ducks for banding purposes will still require considerable experimentation, but present indications are that some form of a submerged net will prove most satisfactory. Such a device will, of course, require an arrangement that will bring captured birds safely to the surface after they have entered the chambers or pockets of the trap.—FREDERICK C. LINCOLN, *U. S. Biological Survey, Washington, D. C., August 14, 1922.*

Northward Range of the Gray Vireo in California.—While on a short collecting trip as guest of Mr. A. Brazier Howell, I spent the afternoon of July 25, 1922, on the west slope of Walker Pass, which is in northeastern Kern County, California, at the southern end of the main high Sierra Nevada. The feature of the occasion was my meeting with an adult pair of Gray Vireos (*Vireo vicinior*). The exact spot was on a steep, north-facing hillside within one-fourth mile south of "Jack's Station" (now merely a roadside camping place); altitude close to 4500 feet; life-zone Upper Sonoran, in a semi-arid phase of it. The birds were in sparse brush (*Garrya, Kunzia, Artemisia tridentata,* and *Cercocarpus betulaefolius*); and a digger pine and a pinyon both grew within one hundred feet of where they were discovered.

I was first attracted by the broken, post-nuptially rendered song of the male—intermittent and sketchy, yet distinct enough from the songs of other vireos to be recognized at once. This male Gray Vireo was promptly shot. It proved to be in molt, with only two of the old tail-feathers remaining and with new feathers showing where old ones had fallen out, in the wings and in most of the body tracts. The weight of the bird was 12.5 grams. It is now catalogued as no. 43295 of the bird collection in the California Museum of Vertebrate Zoology.

A minute or two after shooting the singing bird, I caught sight of the other bird which I concluded was the female of the pair. The only note she gave was a low harsh *churr* or *shray*, given now and then as she hopped slowly through the twiggery. From the bushes she went into the pinyon tree before mentioned, and thence into the digger

[1]Condor, XXIV, May, 1922, p. 95.

[2]Auk, XXXIX, no. 3, July, 1922, pp. 322-334, pls. XI-XIV: "Trapping Ducks for Banding Purposes", by Frederick C. Lincoln.

pine, reaching the unusual height of some fifteen feet above the slope at the base of the tree. Her head was turned from side to side at frequent intervals, especially when she approached and eyed me curiously at a range of not more than twelve feet.

As for field characters, besides the general deliberateness of movement, the thick, dark-colored bill was well seen; the gray tone of color both above and below was noticeable; there was no crest, nor inclination to a crest. I was particularly struck by the relative great length of tail, for a vireo; also this member drooped, most of the time, below the axis-line of the body. It will be recalled that chaparral-dwellers in general, whatever their genetic affiliations, have relatively long tails—for example, Bell Sparrows, Bewick Wrens, Wren-tits, Gnatcatchers, Towhees, and Thrashers.

Some of the above observations will be found new or supplementary to those reported for the Gray Vireo from the San Jacinto region (Grinnell and Swarth, Univ. Calif. Publ. Zool., vol. 10, 1913, pp. 291-297).

This Walker Pass record is the northernmost in California so far known for the species. In fact, only one other occurrence has been reported from north of west-central Los Angeles County (whence reported by Loye Miller, Condor, XXIII, 1921, p. 194). This other northern record (Grinnell, Pac. Coast Avifauna no. 11, 1915, p. 144) is for a point at 2400 feet altitude near Bodfish, on the Kern River, in Kern County. An adult female (now no. 20679, Mus. Vert. Zool.) was collected there by Walter P. Taylor on June 16, 1911. It is in worn "breeding" plumage. Mr. Taylor's field-notes indicate that the bird was taken on a slope clothed in part with junipers and digger pines—evidently good Upper Sonoran. The date of capture would argue for its nesting in the immediate vicinity.

There are vast areas of the same sort of territory as has afforded the two Kern County records, around the southern Sierra Nevada. It all *looks* like perfectly proper country for Gray Vireos. I am tempted to believe that the species will be found widely, though not abundantly, represented there by someone seeking it in May or June, who is familiar with its song and habitat predilections.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, August 19, 1922.*

Two Birds from the Bitterroot Valley, Montana.—Ross Goose (*Chen rossi*). As most of the records of this goose in Montana are from points east of the divide, it seems worth while to record one that was taken at Corvallis, October 10, 1911. The specimen is a female, and is now in the Zoological Museum, University of Minnesota.

Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*). Through an oversight I omitted this species from the list sent to Mr. Saunders several years ago. There is a specimen, a male bird, taken by the writer at Corvallis, January 10, 1910, in the Museum collection at the University of Minnesota. The species was a fairly common winter visitant in this vicinity.—BERNARD BAILEY, *Elk River, Minnesota, June 2, 1922.*

Blackbirds Flocking.—In the May, 1922, issue of THE CONDOR (p. 93) mention is made of the Yellow-headed Blackbird flocking with Brewer Blackbirds. It is not an unusual occurrence here to see a combined flock of Brewer and Red-winged Blackbirds, Cowbirds and one or two Yellow-heads all feeding together on the ground, generally about the early part of May. By that time the Cowbirds have arrived and the other several species have not yet scattered to their widely differing nesting grounds. On May 3, this year, I passed by one bull lying out in the pasture with an attendant group of three or four Cowbirds and one Yellow-headed Blackbird, though I cannot say I saw the latter perch on the bull's back like the Cowbirds.—L. B. POTTER, *Eastend, Saskatchewan, July 8, 1922.*

Notes from Southwestern New Mexico.—White-winged Scoter (*Oidemia deglandi*). An adult female was brought to me November 10, 1921. It had been taken from a flock of six, on a small irrigation pond on Duck Creek, thirty miles northwest of Silver City. None of our local shooters remember to have taken this species in this country.

Zone-tailed Hawk (*Buteo abbreviatus*). From Tyrone, Grant County, New Mexico, a fine adult female was brought to me on April 15, 1922. Another was seen on several occasions in the same locality. I have never before seen this species in ten years careful collecting in southwestern New Mexico.

Arizona Cardinal (*Cardinalis cardinalis superbus*). On May 8, 1922, at Red Rock, Grant County, New Mexico, these Cardinals were abundant, at least a dozen being seen, and a pair taken. The Gila River comes out of a tight "box" just northeast of Red Rock, and at that point their distribution up the river seems to end.

White-winged Dove (*Melopelia asiatica*). At Red Rock on the same date as above I took a male of this species. Ranchmen told me that these birds had appeared in this locality in the spring of the previous year (1921), but that they had never been noticed before that time.—R. T. KELLOGG, *Silver City, New Mexico, July 13, 1922.*

Birds Eating Snails.—In connection with the survey of infested areas and subsequent clean-up of the European snail, *Helix pisana*, at La Jolla, it is interesting to note that two birds have been observed by the writer as feeding on this mollusk.

The infested territory was burned over about three years ago and at that time enormous numbers of snails were killed, a very strong odor of burning flesh being apparent. Immediately thereafter flocks of sea gulls came in and feasted on the roasted snails; but, although outside of the burned area many live snails were in evidence on low bushes and shrubs, no gulls were observed to feed on them.

Another infestation of this snail at La Jolla has now occurred, and while making a survey of the district last week with Mr. A. J. Basinger of the Pest Control Division of the State Department of Agriculture, I noted a male English Sparrow busily engaged in feeding on young live snails clustered on a small dead Monterey cypress tree. At this stage the shells are, of course, soft and easily broken. The English Sparrow has long been regarded as an undesirable immigrant, but it would seem that it has scored a point in its own favor if it is to be regarded as an enemy of this destructive snail.—R. R. MCLEAN, *County Horticultural Commissioner, San Diego, July 26, 1922.*

The Snowy Egret in Los Angeles County, California.—While studying shorebirds at Playa del Rey, September 25, 1922, Mesdames C. H. Hall, A. J. Mix, and F. T. Bicknell, members of the Los Angeles Audubon Society, were fortunate in having a close and unobstructed view of a Snowy Egret (*Egretta candidissima candidissima*). It was on a sand bar in the lagoon in company with a small flock of Western Gulls. Mrs. Hall was the first to sight the bird.

Standing in a semi-meditative attitude among the Gulls, not over two hundred feet from shore, the Egret offered a perfect opportunity for study. With field glasses as aids, though not a necessity, its pure white plumage, size, movements, graceful poses and other identification marks were carefully noted. We also observed the uplifting of one slender black leg, the opening and closing of the yellow toes, the stretching of the beautiful white wing, the opening of the long slender ebony bill with its yellow base, and the sleepy blinking of the eyes which enhanced the yellow of the iris. An occasional light puff of the sea-breeze raised and ruffled the snowy feathers on the bird's head and back, giving a momentary semi-nuptial plumage effect.

The encroaching waters of the incoming tide moistened the sand under the Egret's feet, which it resented by moving a few paces nearer the indifferent Gulls. For fully twenty minutes we studied this beautiful and rare bird, when suddenly, alone and without warning, it took flight above the lagoon and disappeared among the sloughs of the adjoining marsh lands.

The larger, American Egret (*Herodias egretta*) is a regular winter visitant on the San Pedro tide lands and Seal Beach salt marshes and is often studied by the Audubon members. Reporting the event to Mr. L. E. Wyman, Ornithologist at the Los Angeles Museum, he suggested, since the Snowy Egret has so few records in this vicinity, that it was well worth mentioning.—MRS. F. T. BICKNELL, *Los Angeles, California, October 2, 1922.*

Perching Pelicans.—Three times in the past three years I have seen individuals of the California Brown Pelican (*Pelecanus californicus*) perch on the wire stretched just above the top of the rail of our pier. This wire is about ⅛ inch in diameter and it is stretched fairly taut, being supported at intervals of about ten feet by upright spikes so that its height above the pier rail is about four inches.

At 7:52 A. M. on September 19, 1922, while working at the end of the pier I noticed a Brown Pelican alight on the rail about one hundred feet away. I quickly took

a fairly comfortable position with the intention of observing the bird's actions as carefully as possible. I could see his feet distinctly and his toes seemed to curl around and grasp the wire in the same way as those of a perching bird. He was standing almost erect and teetering a good deal in an effort to find his balance. Several times the pelican tried to stoop to a sitting posture but with very unsettling results. Once while trying to preen his breast feathers he almost fell over backward and had to flap his wings vigorously to get balanced again. Finally he became satisfied with the erect posture and remained in it for probably ten minutes. In the erect posture for a time his balancing movements were so nearly imperceptible at one hundred feet distance that I would not have been able to detect them if I had not had the advantage of a series of cross wires on a gate within about thirty feet of the bird. By use of these wires I was able to estimate that at best there was rhythmic movement of the head up and down through a distance of at least a half inch, varied every few seconds by a longer swing of two to three inches.

Just before this relatively stable period he had lifted first one foot and then the other several times as though the wire hurt his feet. Indeed, this performance reminded me very much of a barefoot boy trying to stand on a hot pavement. At the end of the quiet period the pelican began side-stepping and walked on the wire a distance of about four feet at the end of which he turned around facing in the opposite direction. In making the turn he got a good deal unbalanced and saved himself from falling by stepping onto the wooden rail with one foot. He again assumed the erect position and remained thus for some little time until excited by the screeching of a flock of gulls which flew near him. At 8:15 he flew away after having perched on the small wire for twenty-three minutes.

When first alighting he had been facing the pier and away from the water. The half turn made after the side-stepping performance brought him into a position facing the water. Before beginning the side-stepping he had made several efforts to stoop, with very strong appearance of getting ready to fly. Every effort to stoop destroyed his balance and he could not get a good jump into the air for starting flight. I do not think it possible that he could have gotten enough jump to enable him to clear the opposite rail. Whatever the actual reason for the half turn it certainly put him into position (facing the water) to launch easily into flight.

I have mentioned a failure to keep balance while attempting to preen. There were two or three fairly successful attempts but they were confined to very small adjustments of breast feathers with very brief action. At various times in the perching period the head was rotated from side to side but this did not involve much shifting in weight and was not very disturbing to balance.

The three cases which I have seen indicate that pelicans do have perching ambitions and that they can make a very creditable showing in a difficult situation. Do such performances indicate vestigial or initiatory tendencies in behavior?—W. E. ALLEN, *Scripps Institution for Biological Research of the University of California, La Jolla, September 20, 1922.*

EDITORIAL NOTES AND NEWS

The editors of THE CONDOR are once more indebted to Mr. J. R. Pemberton for assistance. The annual index concluding our present volume was in large measure prepared by him.

Volume II, numbers 3-4 (in one), of Dawson's "Journal of the Museum of Comparative Oology" (Santa Barbara) reached our desk on October 31. A very important new nesting record for California is that, by Mr. W. L. Dawson, of the Yellow Rail in Mono County. Mr. A. B. Howell contributes an article on "The Ethics of Collecting" which is fraught with sound sense; the principles set forth ought to be followed conscientiously by all collectors, and then there would be far less of criticism levied at the fraternity than is, unfortunately, now the case. The greater part of this issue of the "Journal" is occupied by accounts of nest-hunting, chiefly with the Sierra Nevada Rosy Finch as the objective, and with the human-interest element emphasized rather than the ornithological.

Volume III, number 3, of "The Murrelet", mimeographed "Official Bulletin of the Pacific Northwest Bird and Mammal Club", reached us November 10. The editor, Mr. F. S. Hall of the Washington State Museum, Seattle, is to be congratulated upon the success of his efforts to produce a creditable journal with small resources. This issue contains several articles and notes on birds, valuable at least from a local standpoint, under the authorship of J. Hooper Bowles, S. F. Rathbun, Kenneth Racey, Walter F. Burton, C. de B. Green, E. A. Kitchin, and others.

The Chicago meeting of the American Ornithologists' Union, held October 23 to 26, was well attended. More than forty papers were read. Elections included Dr. Arthur A. Allen to the class of Fellows, and D. R. Dickey, A. O. Gross, W. Huber, T. I. Storer and J. T. Zimmer to the class of Members.

Mr. M. P. Skinner, Yellowstone Park, Wyoming, is contemplating early publication of his book on the "Birds of the Yellowstone". Readers of THE CONDOR are already familiar with the type of literature produced by Mr. Skinner. He is an accurate observer and good writer, and his book, we predict, will constitute a worthy contribution to western ornithology.

Mr. Howard H. Cleaves, formerly with the San Diego Natural History Museum, is now located at Clarksburg, West Virginia, where he is serving as state secretary for the Wild Life League of West Virginia. The object of this society is to spread the conservation-of-game idea in a state where conservation is badly needed.

It is our conviction that the best piece of conservation legislation proposed for a long time is just now pending before Congress. This is Senate bill 1452 (H. R. 5823), which bill provides for the establishment of game refuges and properly regulated public shooting grounds. Its provisions would be carried out under the auspices of the United States Bureau of Biological Survey, and this would mean its administration upon a logical, scientific basis. We recommend that Cooper Club members support this bill by expressing their approval of it to their legislative representatives in Washington. The bill is likely to be brought up for final action early in the new session of Congress.

Mr. Edgar Chance, a British ornithologist, is the author of a late book entitled "The Cuckoo's Secret" (London, Sedgwick and Jackson), in which the egg-laying habits of the European Cuckoo are described and illustrated from photographs in great detail. A moot point has long been as to whether the bird lays its egg directly into the nest of the victim, or deposits its egg elsewhere and places said egg by the way of its beak into the foster nest. Mr. Chance is so sure of the correctness of his own conclusions, which are of the former import, that he has issued a "challenge" involving a wager of 500 pounds with anyone who wishes to set out to prove the contrary. Thus he hopes to stimulate further careful and scientific enquiry into "the cuckoo's secret". And at the same time the Englishman's love of sport will come into play!

Professor Lynds Jones, head of the Ecology department at Oberlin College, conducted a party of eleven students, via "Fords", from Ohio to California the past summer. The enterprising members of the party thus had the advantage of an ideally practical course in geographical distribution.

COMMUNICATIONS

THE PRESENT STATUS OF THE SUBSPECIES

To the Editor of The Condor:

In these days when ornithological nomenclature and taxonomy seem to have become of more importance than the birds themselves, the primary or, indeed, the sole object of our system is not to be lost sight of. A scientific name, once it is bestowed, is after all only an assembly of two or three words so grouped as to convey an idea of the approximate perch height of the lucky or unlucky recipient in the genealogical tree; or, to put it differently, a statement of the evolutionary progress made by the particular group or individual in question, down to the year A. D. 1922, or whenever the baptism took place. Now, it seems to me that the fact that a certain horned lark's back, or a certain fox sparrow's bill is different from the backs or the bills of horned larks or fox sparrows occupying other areas is distinctly secondary to the fact that separate geographic situations have caused certain changes to take place. Unfortunately, our only way of expressing what has happened is in terms of millimeters or of color, or by some other equally unsatisfactory designation. These means of describing what changes have occurred

are undoubtedly what have given most people a wrong conception of systematic work in general, and of the so-called "subspecific" races in particular. If the rank and file of bird students would put aside the idea that "microscopic" subdivisions of plastic species are made only for the purpose of bestowing new names, and think of the determined "subspecies" as admittedly short, but still definite steps along the evolutionary highway, not only would the whole science of ornithology be benefited by a new interest, but we would be spared much of the ranting about "hair splitting", in which well-meaning but misguided souls indulge from time to time. What constitutes a subspecies is just now a difficult question to answer. A composite opinion gained by personal conversation, and by perusal of current literature can be best expressed by, "Why is a hen?" Some would use only a binomial for every recognizable form, others want to reduce to subspecific status all species bearing close resemblances to one another, and still others champion two kinds of subspecies! Obviously, the adoption of any of these extremes would work much harm, if for no other reason than that the true genetic relationships between most forms would not properly be expressed by the terms employed.

Most conservative ornithologists advocate a middle course and believe that intergradation should be actually proven before reducing any form to subspecific status. But, what sort of intergradation? If we take into consideration all angles of the problem, what can we possibly accept save that of geographic continuity,—an actual *blood* relationship? To designate as varieties geographically isolated forms which have been completely segregated for thousands, perhaps tens of thousands of years from similar organisms found in another area (or even on another continent!) simply because overlapping characters are shown by a few individuals is *not* telling the true story of conditions which now exist. True, there was undoubtedly one common ancestor; but so, for example, was there for all the grebes, or for all the gulls. If intergradation of all present-day species of grebes, or between any two of them were to be established through fossil remains—and this is not an impossible hypothesis—then, to be consistent, we should have now to regard them as subspecies! Intergradation through individual variation is inviting too many chances for error. As Grinnell (Auk, vol. 37, 1921, p. 469) has pointed out, what assurance is there that young or subadults or even "sports" may not be used in attempting to prove the point?

The criteria of isolation for the use of the binomial and of actual blood fusion for use of the trinomial will, I believe, prove the ultimate ones to be adopted not only because they permit of more accuracy in allocation, but also because of the uniformity possible under their use.

Yours very truly,

A. J. VAN ROSSEM,

Pasadena, California, July 14, 1922.

LIFE HISTORIES OF NORTH AMERICAN BIRDS

The Editor of The Condor:

Realizing that no one man can know all there is to know about all the birds and that the completeness of the Life Histories of North American Birds depends on the coöperation which the author receives from others, I wish to make this report of progress and appeal to your readers for contributions, trusting that you will find the space to publish it at an early date.

Two volumes have been published and the third, containing the Petrels and Pelicans and their allies, is printed and should soon be out. The manuscript for the fourth volume, containing the Ducks, up to and including the Ring-necked Duck, is now in Washington in finished form and ready for publication. It is not too late to add to this, when I correct the galley proof, any notes of importance on habits or distribution, and not too late to substitute any particularly fine photographs for those that I have already selected.

I am now at work on the fifth volume, which will contain the remainder of the Ducks and the Geese and Swans. I expect to finish this during the winter and send it to the publishers in the spring. The life histories are practically all written, subject to revision, but the photographs have not been selected.

I have no notes on the courtship of the American and White-winged Scoters or of any of the Geese, except the Canada, or on any of the Swans or Tree Ducks. I have no nesting photographs of Harlequin Duck, Barrow Golden-eye, any Geese except White-fronted and Canada, any Swans, or any Tree Ducks. I should be glad to receive contributions of notes or photographs to fill in any of these gaps. Or I should be glad to correspond with anyone who has anything else to offer. I am, of course,

well supplied with photographs illustrating nests, eggs and young of all the common species, but there are many gaps still to be filled. I am trying to read everything that is published on American birds, but I have no access to private notes, that have not been published, unless they are sent in as contributions. I shall soon begin work on the sixth volume, which will contain the Herons and Rails and their allies. Contributions for this would be welcome at any time. Contributors will receive full credit for whatever material they send in and, if it is material that I can use, their names will be placed on the mailing list to receive the volumes when published.

Those who have seen the earlier volumes can understand what is wanted. Hoping for some generous coöperation I am,

Very truly yours,

A. C. BENT,

Taunton, Massachusetts, September 13, 1922.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

JULY.—The Northern Division of the Cooper Ornithological Club met at the usual place and hour on July 27. Pres. Swarth presided and the following members were present: Mesdames Allen, Ferguson, Grinnell, Kelly, Steilberg; Miss Pringle and Miss Flinn; Messrs. Bunker, Cooper, Dixon, Evermann, Hunt, Willard Grinnell, L. H. Miller, Storer, Swarth, and Wright. Among the visitors were Mrs. Bunker, Mrs. Cooper, Mrs. Hunt, Mrs. Slack, and Mr. Jaeger.

June minutes from the Northern and Southern divisions were read and the former approved. Mr. Edmund Carroll Jaeger, 146 W. 6th St., Riverside, was proposed for membership by H. S. Swarth, and Mr. Clark Blickensderfer, 850 Grant St., Denver, Colorado, by Tracy I. Storer.

Dr. Evermann reported the departure of scientists who have undertaken an expedition to the islands off the coast of Mexico and southern California under the joint auspices of the Mexican Government, the California Academy of Sciences, and the U. S. Bureau of Research to investigate as to the presence of fur seals.

Prof. Loye Holmes Miller then gave an outline of the materials so far available to students of fossil birds in California. Adjourned.—AMELIA S. ALLEN, *Secretary Northern Division.*

AUGUST.—The regular meeting of the Northern Division of the Cooper Ornithological Club was held at the usual place and hour on August 24, 1922. Mr. Swarth was in the chair and the following members and friends were present: Messrs. Bell, Bunker, Chas. Bryant, Cooper, Dice, Grinnell, Hunt, Mailliard, Storer, and Stow; Misses Atsatt, Burk, Flinn; Mesdames Allen, Bogle, Davenport, Grinnell, Kelly, Mead, Roe, and Schlesinger. Visitors were: Mrs. Bunker, Mrs. Nimmo, and Mr. Hatt.

Minutes of the July meeting were read and approved, and the following names were presented: Miss Ethel M. Archer, R. D. 4, Anaheim, Miss Althea McIntyre and Miss Marietta Martin, 1345 P St., Fresno, by Miss S. R. Atsatt, and Mr. George W. Moore, 318 E. 9th St., Tulsa, Oklahoma, by W. A. Strong.

Business completed, the members present contributed observations from different localities visited during the summer. Adjourned.—AMELIA S. ALLEN, *Secretary.*

SEPTEMBER.—The regular meeting of the Cooper Ornithological Club, Northern Division, was held at the usual time and place on September 27. Vice-President Cooper was in the chair and the following members were present: Mesdames Allen, Bogle, Davenport, Reygadas, and Schlesinger; Misses Atsatt, Ayer, Burk, Flinn, Gunn, Woodruff, and Wythe; Messrs. Bassett, Bryant, Cooper, Evermann, Gignoux, Storer, and Wright. Visitors were: Mrs. Bassett, Miss Bassett, and Miss Cooper.

Minutes of the August meeting were read and approved and the July minutes of the Southern Division were read. Applications for membership were received from Mrs. Nina M. Slack, 304 E. 16th St., Oakland, sponsored by Amelia S. Allen; Mr. Kenneth McLeod, Jr., 2324 Vine St., Berkeley, sponsored by J. Grinnell; Miss Edna M. Fisher, 2410 Fulton St., Berkeley, sponsored by Tracy I. Storer, and Mr. and Mrs. C. R. Thomas, 2022 Francisco St., Berkeley, sponsored by Amelia S. Allen. The Southern Division submitted the name of Mr. George Frean Morcom for honorary membership in the Club, final action to be taken at the October meeting.

Business completed, the club listened to an account of a motor trip through the North-west by Mr. F. N. Bassett. Adjourned. —AMELIA S. ALLEN, *Secretary.*

SOUTHERN DIVISION

JULY.—Regular monthly meeting of Cooper Ornithological Club, Southern Division, was held July 27, 1922, at the usual hour

and place. Dr. Rich presided, with the following members present: Mesdames Brown, Law, Schneider, and Warmer; Misses Ellis, Potter, Delphia Miller, and Mary Mann Miller; Messrs. Allen, Chambers, Colburn, Girvin, Grinnell, Hanaford, Hart, Howard, Howell, Law, Little, Millard, Robertson, Trewhella, Warmer, and Wyman. Visitors were: Mesdames Anthony, Trewhella, Vaughn and Wyman, and Mr. Hill.

Minutes of the June meeting were read and approved, while reading of Northern Division minutes for May and June, on proper motion, was omitted. Applications for membership were: Clifford M. Drury, 2407 Dana St., Berkeley, by Dr. Warmer; Raymond A. Campbell, Huntington Beach, and H. R. Hill, 815 W. 37th St., Los Angeles, by L. E. Wyman. The Northern Division sent the names of Frank O. Adams and Frank Bacon.

The following proposition was read by the Secretary: "We, the undersigned active members of the Cooper Ornithological Club hereby propose for Honorary Membership in the Club, George Frean Morcom. We believe this to be an appropriate way of recognizing Mr. Morcom's long and loyal support of the Club and of its ideals." Signed: W. Lee Chambers, Guy C. Rich, O. W. Howard, J. Eugene Law, Howard Robertson.

Mr. J. Grinnell then read a paper entitled "An Inquiry into the Supposed Decrease of Bird Life in California." He placed the subject in a new and interesting light, and the general and lengthy discussion that followed closed the session. Adjourned.—L. E. Wyman, *Secretary Southern Division.*

August.—Regular meeting of Cooper Ornithological Club, Southern Division, was held at Los Angeles Museum at 8 p. m., August 31, Dr. Rich presiding. Other members present were: Mrs. Brown; Messrs. Appleton, Bramkamp, Campbell, Chambers, de Laubenfels, Hill, Howell, Lamb, Law, Miller, L. Peyton and Wyman. Visitors were: Miss Vaughn, Mrs. Hill, Mrs. Wyman, and Alden Miller.

Minutes of July meeting were read and approved. New presentations were: Mrs. Joseph Anthony, 629 No. Belmont Ave., Los Angeles, by Mrs. Schneider; Frederick C. Lincoln, Biological Survey, Washington, D. C., Margaret W. Boardman, 1239 W. 11th St., Los Angeles, Helena Krause, 820 26th St., San Diego, and Grace A. Hill, 2143 Cedar St., Berkeley, all by Mr. Chambers; Mabel Adelaide Myers, 617 W. Center St., Anaheim, by Mr. Pierce; Edmund C. Jaeger, 1462 W. 6th St., Riverside, by Mr. Swarth. The Northern Division sent the names of Dr. C. H. Wood and Clark Blickensderfer.

A circular from Dr. E. W. Nelson, Chief of the Biological Survey, explanatory of the proposed "Public Shooting Ground Game Refuge Bill", was read by the Secretary. Mr. Law moved that the Southern Division of the Club go on record as favoring this bill, and that the California Fish and Game Commission be advised of this action. Seconded by Mr. Chambers, and carried.

Inspection of a miscellaneous lot of Alaskan birds, and the attendant general discussion, ended the session. Adjourned.—L. E. Wyman, *Secretary.*

September.—Regular meeting of Cooper Ornithological Club, Southern Division, was held at 3 p. m., September 24, at the home of Dr. L. H. Miller, Los Angeles. President Rich held the chair. Twenty-three members and eight visitors were present.

Minutes of the August meeting were read and approved, while those of the Northern Division for July and August were read by title only. Mr. Chambers presented the names of Perley Arthur Smoll, 822 E. Monument St., Colorado Springs, Colo.; Harvey T. Kimball, Magma Copper Co., Superior, Ariz.; Archibald Douglas Henderson, Belvedere, Alberta, Canada; and Karl A. Pember, Woodstock, Vt. Charles L. Whittle presented the name of Charles Benton Floyd, 454 Wolcott St., Auburndale, Mass.; Mrs. Marion Ware Low, 27 La Brea St., Hollywood; and Laurence Brown Fletcher, 57 Catswold Road, Brookline, Mass. Karl R. Coolidge, Box 12, Hollywood, was sponsored by Mr. van Rossem. The name of George W. Morse came from the Northern Division.

A letter from the California Fish and Game Commission, defining their attitude toward the Public Shooting Ground Game Refuge bill, was read by the Secretary. This shed new light on the subject, and on motion of Mr. Law, seconded by Dr. Miller, the members voted to hold in abeyance further action relative to the proposed bill.

A complimentary membership card in the Los Angeles Audubon Society, made out to the Club, was presented by the Secretary. Dr. Miller moved that the Secretary be instructed to write to the Audubon Society a letter of appreciation of the honor conferred. Seconded by Miss Miller; carried.

The meeting then adjourned to the informality of the customary watermelon feast and general sociability. Adjourned.—L. E. Wyman, *Secretary.*

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